AN OVERVIEW OF THE QUALITY FUNCTION DEPLOYMENT (QFD) TECHNIQUE

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TOPICS

. Introduction
  - **Historical Background, What Is QFD**

. Overview of the QFD Technique
  - **Objectives, Processes, Benefits, . . .**

. How QFD Works

. Closing Thoughts

INTRODUCTIOᴺ

- Historica Background
- What 's QFD

HISTORICAL BACKGROUND

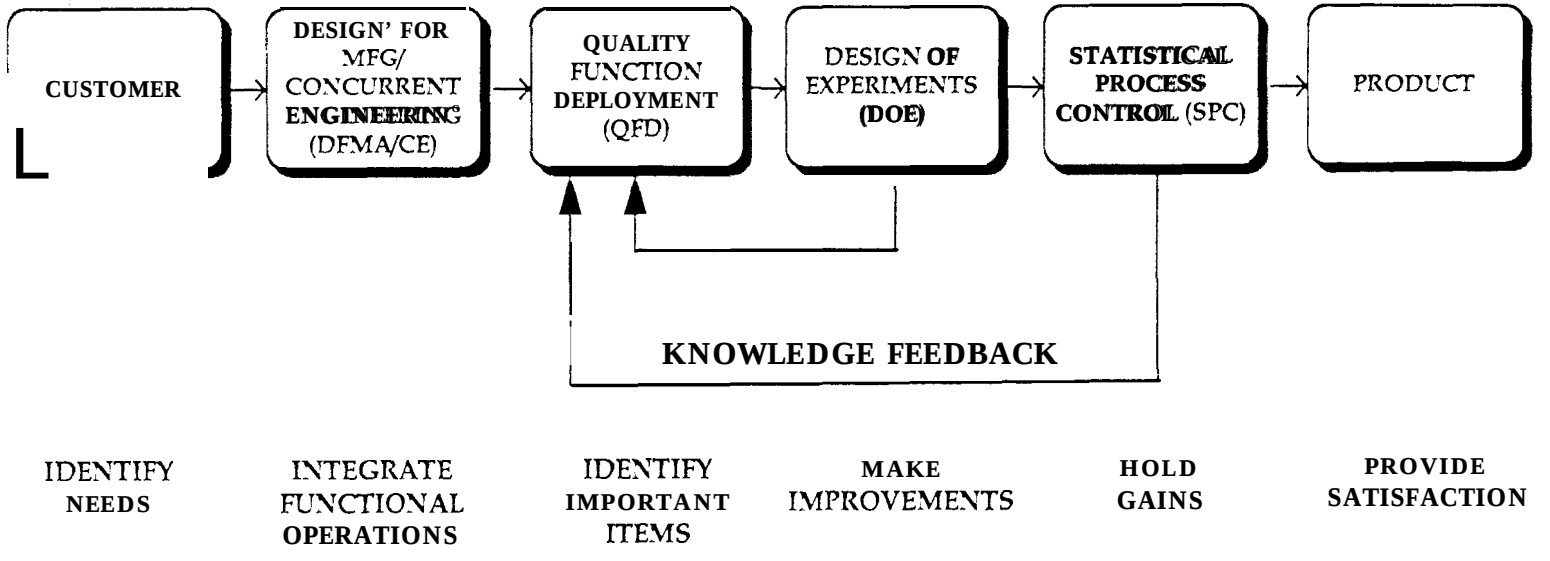
- QFD was first developed in Japan in the mid 1970s at Mitsubishi's Kobe Shipyards (Dr. Akao, Dr. Mizuno and Dr. Furukawa)
- In 1983, Dr. Akao introduced QFD to the U.S.
  - **John Deere (1988), Procter and Gamble (1986), General Electric (1988)**
  - **Ford (1988), Chrysler (1986), GM** (1991)
  - **Hughes Aircraft (1986), Boeing (1988), McDonnell Douglas (1986)**
  - **Martin Marrietta (1988), Texas Instruments (1986), HP (1985), 3M (1984),** Digital **(1988), AT & T Bell Labs, Xerox (1986)**

WHAT IS QFD?

- QFD is a product planning tool and a process methodology
- QFD enables all organizations / departments / individuals (in your business / project) to systematically focus on the critical performance / functions / characteristics of your product that are most important to the customer
- QFD is part of Total Quality Management (TQM)

QFD is Part of TQM

TQM TOOLS



OVERVIEW

. Objectives of QFD

. The QFD Processes

. Benefits of the QFD Technique

OBJECTIVES OF QFD

. Produce the right product right the first time

. Produce the right product within budget and on time

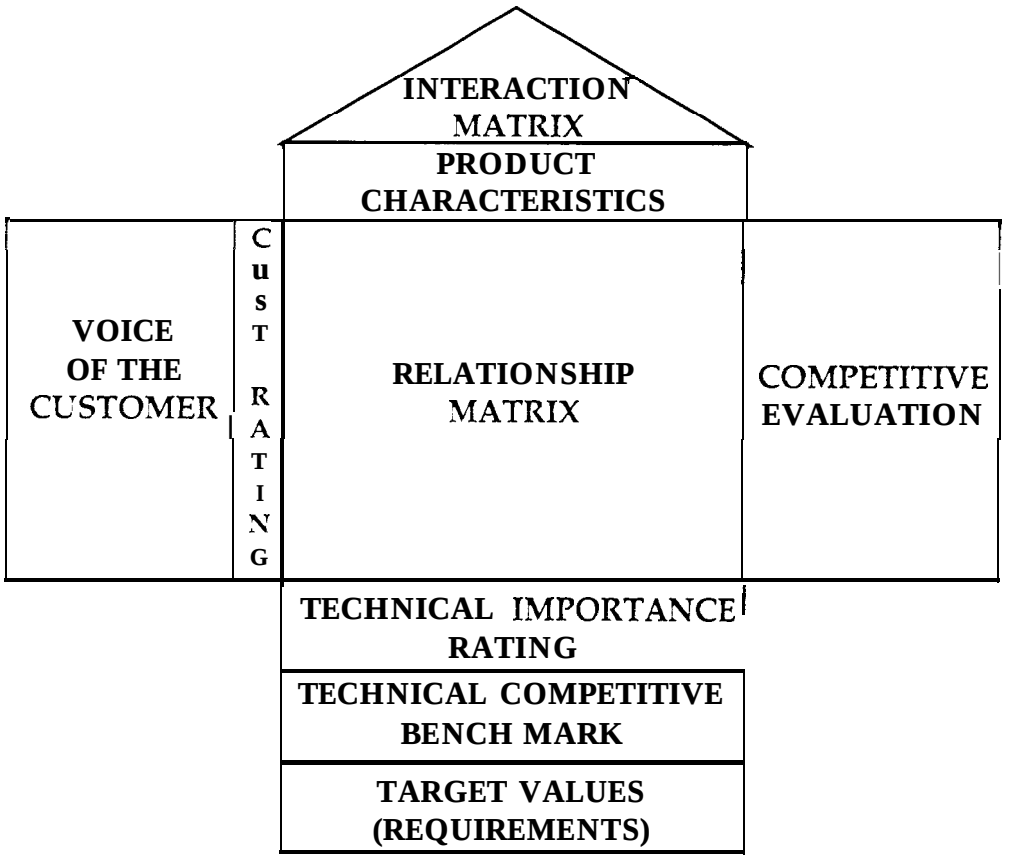
. Deploy new technologies, while being driven by customer priorities and competitive benchmarking

THE QFD PROCESSES

- Identification of customers' requirements / needs / wants [what]
- Specification of product performance requirements [how (to meet the what)]
- Analysis of matrix relationships [what vs. how and how vs. how]
- Benchmark product characteristics [alternative designs]
- Establish target values for performance requirements

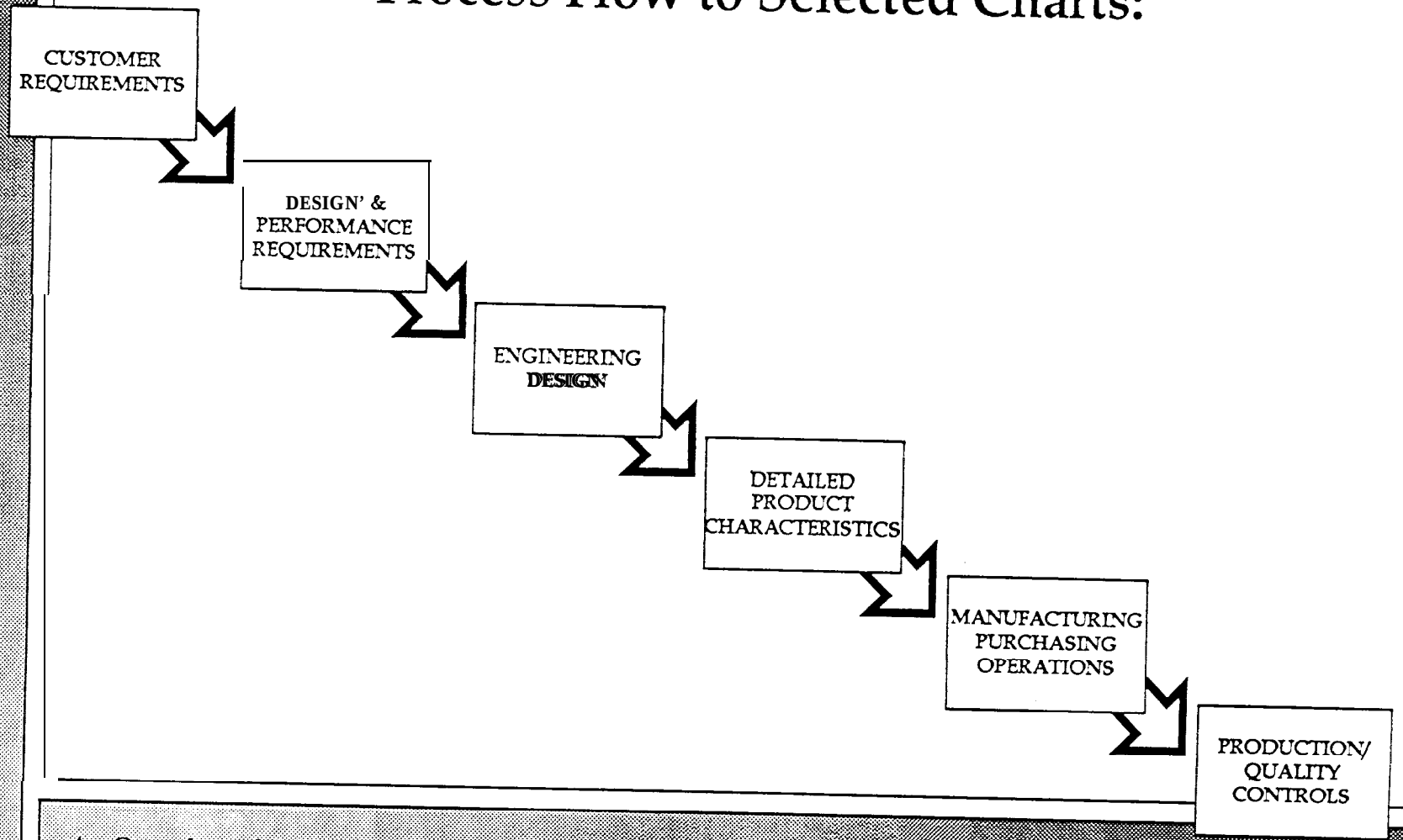
THE QFD PROCESSES

The Requirements Matrix: The House of Quality

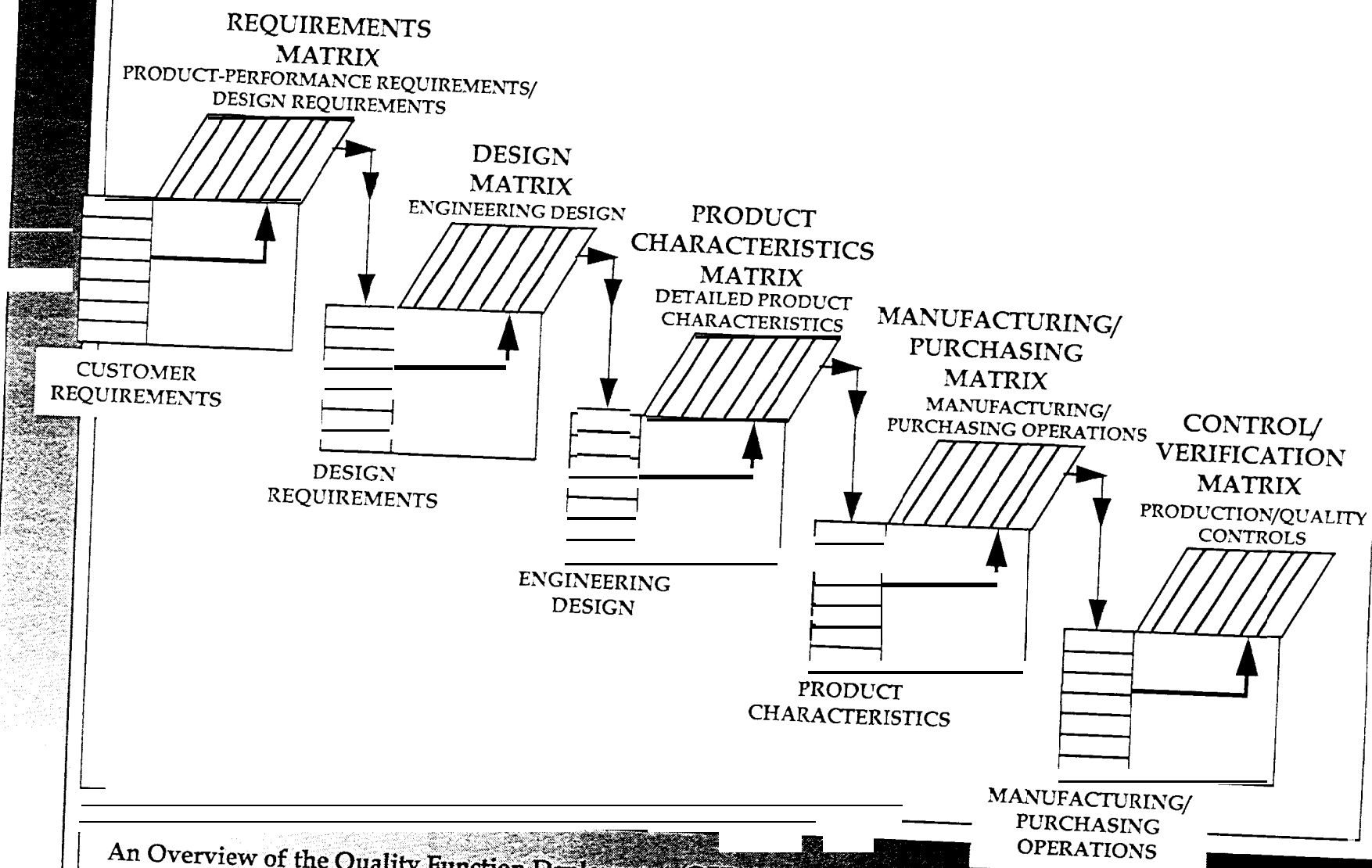


THE QFD PROCESSES

Process Flow to Selected Charts:



THE QFD PROCESSES



BENEFITS OF THE QFD TECHNIQUE

1. Captures and prioritizes what is important to the customer in a faster-cheaper-better (FCB) manner

BENEFITS OF THE QFD TECHNIQUE

2. Clarifies tradeoffs and control points
   - " What vs. **how**
   - " How vs. **how**
   - **• "Our" product vs. competitors' products**

BENEFITS OF THE QFD TECHNIQUE

3. Improves customer satisfaction
   - Establishes "true needs" of customers via minimization of conflicting requirements and via importance rating
   - Ensures conformance of all product characteristics to customer requirements (from planning through production to delivery) via systematic correlation and traceability

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BENEFITS OF THE QFD TECHNIQUE

4. Facilitates technology insertion
   - **Focuses on "critical" performance areas and key** quality **characteristics**
   - **Is driven by competitiveness**

BENEFITS OF THE QFD TECHNIQUE

5. Improves team effectiveness

- **Synergism through interaction**
- **Systems-approach to tradeoff analysis (via "cross-functional team")**
- **Improves communications**

BENEFITS OF THE QFD TECHNIQUE

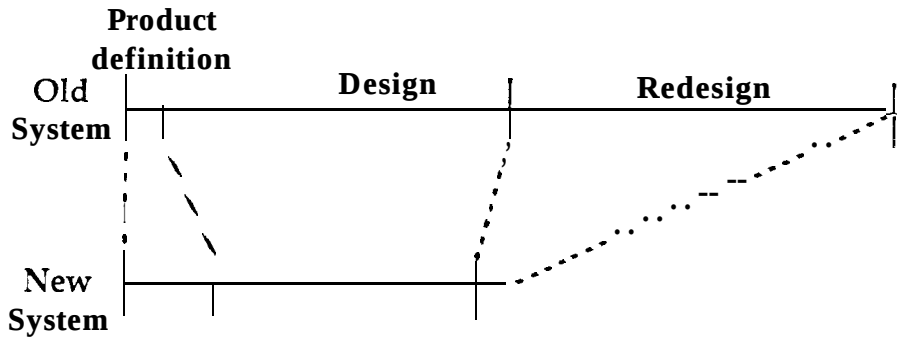
6. Reduces cycle time
   - **Fewer engineering changes**
   - **Minimum rework (caused by fewer changes in requirements or design specs)**
   - **Shift in life-cycle profile**

BENEFITS OF THE QFD TECHNIQUE

. Shift in lifecycle profile

- **More effort spent upfront in the requirements phase contributes to less engineering changes, less rework and less scrap**
- **Less-engineering-changes reduce redesign efforts, which are typically hidden under extended implementation efforts**

. Total **effort and time required to finish the project is reduced**

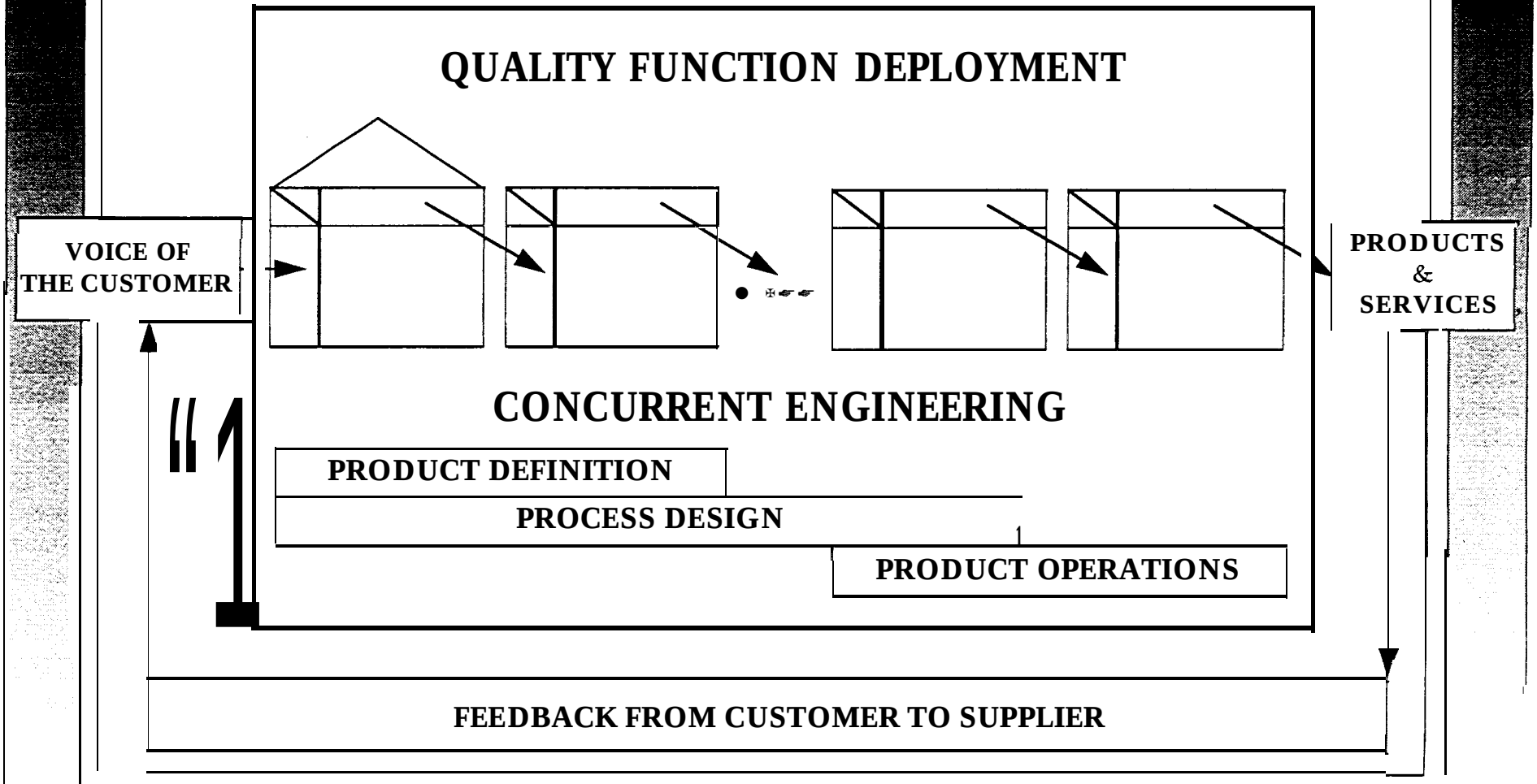


WHERE QFD IS BEST UTILIZED

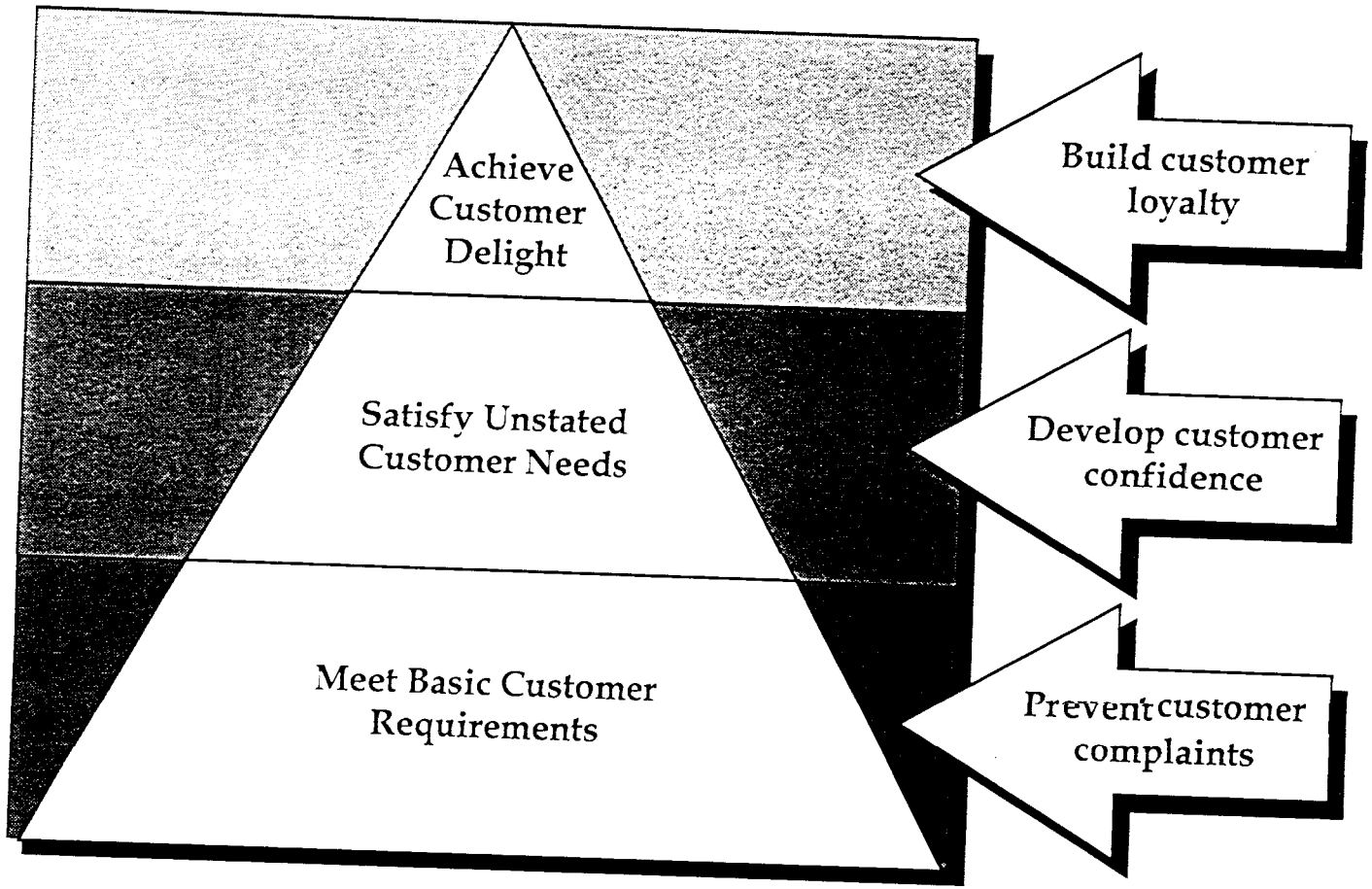
. Any hardware systems or software intensive systems that require:

- **Teamwork and muIti-functional** skillmix
- **. Rigorous prioritization or importance-rating of requirements**
- **. Concurrent design**
- **That customer satisfaction be the ultimate goal**

QFD AND CONCURRENT DESIGN



QFD AND CUSTOMER SATISFACTION



SUCCESS FACTORS OF QFD USE

1. Customer / user involvement from start to finish of the project
2. Adequate training of QFD team
3. Ensure that management understands QFD and commits appropriate support
4. Use an experienced facilitator to coordinate and run the meetings
5. Establish intermediate checkpoints and deliverables
6. Set meeting schedules for full member participation

HOW QFD WORKS

- Planning Phase
- Descriptive Phase
- Breakthrough Phase
- Implementation Phase
- Guidelines for Selection of QFD Team
- Functional Roles of QFD Team

HOW QFD WORKS

- Planning Phase

HOW QFD WORKS

. Descriptive Phase

This phase defines the product with respect to the following perspectives:

- **Customer demands/requirements**
- Quality **characteristics/product-performance requirements**
- **Functions**
- **Levels of detail**
- **New concepts/technologies**
- **Reliability aspects**

HOW QFD WORKS

. Breakthrough Phase

- **Use the charts or matrices in combination for added** value (example: **quality chart and cost chart, cost chart and failure chart, etc.)**
- Select **areas for improvement through new technology, better reliability and new concept**

HOW QFD WORKS

. Implementation Phase

- **The team derives methods for comprehensive monitoring of the product**

GUIDELINES FOR SELECTION OF QFD TEAM

- Cross-functional / multidisciplinary representation
- Competency (rather than political correctness)
- Constancy in team membership
- Experienced facilitator

FUNCTIONAL ROLES OF QFD TEAM

- Customer
- Facilitator
- Analyst/Interviewer
- Project Engineer
- Design Engineer/Analyst

ROLE DESCRIPTIONS

. Customer

- **Be a "real" stakeholder**
- **Voice his/her needs, and rate their importance**

. Facilitator Role

- **Assist the team in the definition of the problem**
- **Keep the team from drifting**

ROLE DESCRIPTIONS (continued)

- Analyst/Interviewer Role:
  - **Identify and interview customers**
  - **Analyze and generate correlation between the "what" and "how"**
    - "What" the customer needs, and "how" these needs will **be met**
  - **Assist in translating the "how" statements into target values for performance parameters and design requirements**

ROLE DESCRIPTIONS (continued)

- Project Engineer
  - **Assist multifunctional team to brainstorm and achieve consensus**
  - **Participate in cross-correlation analysis**
  - **Identify competitors (for benchmarking)**
  - **Identify target values for performance-parameters and design requirements**

ROLE DESCRIPTIONS (continued)

. Design Engineer / Analyst

- **Identify design characteristics that contribute most (and least) to customer requirements**
- **Participate in cross-correlation analysis**
- **Identify design target-values and compare benchmark data (or comparable process capabilities)**

CLOSING THOUGHTS

1. QFD represents a method by which quality is achieved (i.e., the right product is developed)
2. It is a powerful communication tool that enables multifunctional teams to achieve their maximum potential by focusing and integrating their specialized knowledge
3. QFD reduces documentation, rework, development time, and overall lifecycle cost of project